

Missouri Department of Natural Resources

## Total Maximum Daily Load Information Sheet

### Horseshoe Creek

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#### Waterbody Segment at a Glance:

**Counties:** Lafayette, Jackson  
**Nearby Cities:** Oak Grove  
**Length of impairment:** 3.1 miles  
**Pollutants:** Biochemical Oxygen Demand (BOD) and Ammonia  
**Source:** Oak Grove North and South Wastewater Lagoons



State map showing location of watershed

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**TMDL Priority Ranking:** High

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#### Description of the Problem

##### Beneficial uses of Horseshoe Creek

- Livestock and Wildlife Watering
- Protection of Warm Water Aquatic Life
- Protection of Human Health associated with Fish Consumption

##### Use that is impaired

- Protection of Warm Water Aquatic Life

##### Standards that apply

- The Missouri Water Quality Standard (WQS), found in 10 CSR 20-7.031 Table A, for dissolved oxygen (DO) in streams is 5.0 mg/L (milligrams per liter or parts per million). A value less than 5 mg/L is allowable if it represents the normal “background” condition of a stream.
- The standards for ammonia vary with water temperature and pH. At typical temperatures and pH values, a summer ammonia standard would be 1.2 mg/L with a winter standard of 2.1 mg/L. These values are taken from Table B in 10 CSR 20-7.031.

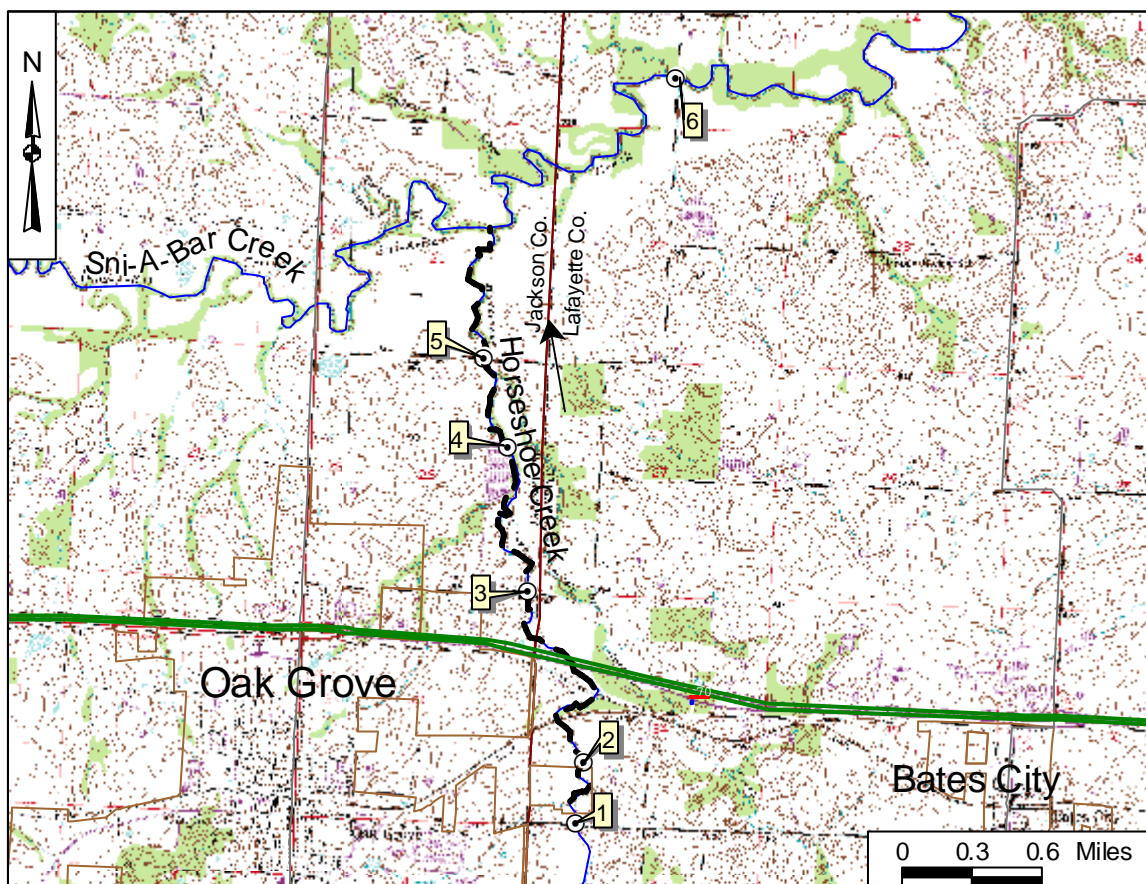
#### Background Information and Water Quality Data

Conditions in Horseshoe Creek are not protective of aquatic life. In recent Water Quality Studies (2001, 2003), the creek was found to be high in ammonia. Ammonia is a common by-product of wastewater treatment and, under certain conditions, can be toxic to aquatic life. Also, low levels of DO were documented in the creek and many aquatic organisms require high levels of oxygen to survive. Wastewater effluent that is high in BOD will lower the DO in a stream. Both of these conditions in Horseshoe Creek are due to discharges from the Oak Grove Lagoons. A mechanical

treatment plant that discharges to a tributary of Sni-a-Bar Creek will replace the Oak Grove lagoons. The new plant eliminates the discharges to Horseshoe Creek. Like all wastewater discharges in Missouri, the new Oak Grove WWTP must meet the requirements of a discharge permit issued by the Missouri Department of Natural Resources. The new plant can meet the water quality standards by complying with the effluent limits in the permit. The department submitted the permit in lieu of a TMDL to the U.S. Environmental Protection Agency for approval Feb. 23, 2006.

The water quality studies of Horseshoe Creek and Sni-A-Bar Creek downstream of Horseshoe Creek were conducted in August 2001 and July 2003. The water quality data from these studies are shown in the table below, along with a map of the impaired segment of the creek and sampling sites.

### Horseshoe Creek in Lafayette and Jackson Counties, Missouri



--- Impaired Segment      ← Direction of flow

#### Sampling Sites

- 1 – Horseshoe Creek 0.1 mile upstream of South Lagoon
- 2 – Discharge from South Lagoon
- 3 – Horseshoe Creek 1.1 mile downstream of South Lagoon
- 4 – Discharge from North Lagoon
- 5 – Horseshoe Creek 0.4 mile downstream of North Lagoon
- 6 – Sni-A-Bar Creek 2 miles downstream of mouth of Horseshoe Creek

Summary of Water Quality Studies on Horseshoe Creek by the Department of Natural Resources, August 2001 and July 2003					
Site #	Flow (cubic feet per second)	Mean Water Temperatur e (in degrees Celsius)	pH	Mean Ammonia as Nitrogen (mg/L)	Mean Early Morning Dissolved Oxygen (mg/L)*
1	0.25	28	7.6	0.01499	3.3
2	0.55	29	7.6	20.4	1.4
3	0.25	27	7.5	13.9	1.7
4	0.35	29	7.9	5.23	2.1
5	0.46	27	7.6	7.73	0.8
6	7.80	28	7.5	0.15	3.3

\*To be most protective of water quality, DO is measured in the early morning, when it is at its lowest.

**For more information call or write:**

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